

**ABSTRACT**

A transmitter and a receiver are disclosed herein that support transmit antenna diversity using space-time block coding in a wireless communication system. The transmitter produces symbol combinations containing, as their  
5 elements, input symbols, the inversions and conjugates of the symbols, and symbols obtained by rotating the phases of the symbols once, forms a matrix having symbols in at least two columns orthogonal to each other with the symbol combinations, and transmits the matrix. The receiver detects symbols that minimize maximum likelihood (ML) decoding metrics over all possible symbols  
10 using channel gains from transmit antennas to a receive antenna. Also, the receiver selects candidate symbols among all possible symbols according to the characteristics of transmitted modulation symbols and detects symbols that minimize the ML decoding metrics.